

# Prometheus

Prometheus is an open-source system monitoring and alerting toolkit originally built at SoundCloud. It is now a standalone open source project . Prometheus joined the Cloud Native Computing Foundation in 2016 as the second hosted project, after Kubernetes.

## Features

1. a multi-dimensional data model with time series data identified by metric name and key/value pairs
2. PromQL, a flexible query language to leverage this dimensionality
3. no reliance on distributed storage; single server nodes are autonomous
4. time series collection happens via a pull model over HTTP
5. pushing time series is supported via an intermediary gateway
6. targets are discovered via service discovery or static configuration
7. multiple modes of graphing and dashboarding support

```
arunesh@Arunesh:~$ kubectl delete all --all
pod "my-deploy-855fc965b7-z6h7n" deleted
service "kubernetes" deleted
service "my-service" deleted
deployment.apps "my-deploy" deleted
replicaset.apps "my-deploy-855fc965b7" deleted
arunesh@Arunesh:~$ sudo useradd \
--system \
--no-create-home \
--shell /bin/false prometheus
[sudo] password for arunesh:
arunesh@Arunesh:~$ sudo useradd --system --no-create-home --shell /bin/false prometheus
arunesh@Arunesh:~$ wget https://github.com/prometheus/prometheus/releases/download/v2.47.1/prometheus-2.47.1.linux-amd64.tar.gz
tar -xvf prometheus-2.47.1.linux-amd64.tar.gz
sudo mkdir -p /data /etc/prometheus
cd prometheus-2.47.1.linux-amd64/
sudo mv prometheus promtool /usr/local/bin/
sudo mv consoles/ console_libraries/ /etc/prometheus/
sudo mv prometheus.yml /etc/prometheus/prometheus.yml
sudo chown -R prometheus:prometheus /etc/prometheus/ /data/
--2025-03-22 06:32:00-- https://github.com/prometheus/prometheus/releases/download/v2.47.1/prometheus-2.47.1.linux-amd64.tar.gz
Resolving github.com (github.com)... 20.207.73.82
Connecting to github.com (github.com)|20.207.73.82|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/2f9b7b37-63a0-428b-adb5-0294482fd743?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20250322%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20250322T063201Z&X-Amz-Expires=300&X-Amz-Signature=a7d8e5e37ee86efa2c54b480e4b398fde69097d6e8165f67a0e11baaa46dffc6X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dprometheus-2.47.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2025-03-22 06:32:01-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/6838921/2f9b7b37-63a0-428b-adb5-0294482fd743?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=releaseassetproduction%2F20250322%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20250322T063201Z&X-Amz-Expires=300&X-Amz-Signature=a7d8e5e37ee86efa2c54b480e4b398fde69097d6e8165f67a0e11baaa46dffc6X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dprometheus-2.47.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.108.133, 185.199.109.133, 185.199.110.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 95713066 (91M) [application/octet-stream]
Saving to: 'prometheus-2.47.1.linux-amd64.tar.gz'

prometheus-2.47.1.linux-amd64.tar.gz 100%[=====] 91.28M 3.24MB/s in 30s

2025-03-22 06:32:32 (3.03 MB/s) - 'prometheus-2.47.1.linux-amd64.tar.gz' saved [95713066/95713066]
```

```
arunesh@Arunesh: ~  
prometheus-2.47.1.linux-amd64/  
prometheus-2.47.1.linux-amd64/LICENSE  
prometheus-2.47.1.linux-amd64/NOTICE  
prometheus-2.47.1.linux-amd64/prometheus.yml  
prometheus-2.47.1.linux-amd64/conssoles/  
prometheus-2.47.1.linux-amd64/conssoles/prometheus.html  
prometheus-2.47.1.linux-amd64/conssoles/prometheus-overview.html  
prometheus-2.47.1.linux-amd64/conssoles/node-cpu.html  
prometheus-2.47.1.linux-amd64/conssoles/index.html.example  
prometheus-2.47.1.linux-amd64/conssoles/node.html  
prometheus-2.47.1.linux-amd64/conssoles/node-disk.html  
prometheus-2.47.1.linux-amd64/conssoles/node-overview.html  
prometheus-2.47.1.linux-amd64/promtool  
prometheus-2.47.1.linux-amd64/console_libraries/  
prometheus-2.47.1.linux-amd64/console_libraries/prom.lib  
prometheus-2.47.1.linux-amd64/console_libraries/menu.lib  
prometheus-2.47.1.linux-amd64/prometheus  
arunesh@Arunesh:~/prometheus-2.47.1.linux-amd64$ cd  
arunesh@Arunesh:~$ ls  
DevOps config deploy.yml new_dep.yml prometheus-2.47.1.linux-amd64 prometheus-2.47.1.linux-amd64.tar.gz simple-web-app  
arunesh@Arunesh:~$ cd  
rm -rf prometheus-2.47.1.linux-amd64.tar.gz  
prometheus --version  
sudo vim /etc/systemd/system/prometheus.service  
prometheus, version 2.47.1 (branch: HEAD, revision: c4d1a8beff37cc004f4dc4ab9d2e73193f51aaeb)  
  build user: root@4829330363be  
  build date: 20231004-10:31:16  
  go version: go1.21.1  
  platform: linux/amd64  
  tags: netgo,builtinassets,stringlabels  
arunesh@Arunesh:~$ sudo vim /etc/systemd/system/prometheus.service  
arunesh@Arunesh:~$ sudo systemctl enable prometheus  
sudo systemctl start prometheus  
sudo systemctl status prometheus  
journalctl -u prometheus --no-pager  
Created symlink /etc/systemd/system/multi-user.target.wants/prometheus.service → /etc/systemd/system/prometheus.service.  
● prometheus.service - Prometheus  
   Loaded: loaded (/etc/systemd/system/prometheus.service; enabled; preset: enabled)  
   Active: active (running) since Sat 2025-03-22 06:40:05 UTC; 21ms ago  
 Main PID: 65517 (prometheus)
```

```
Active: active (running) since Sat 2025-03-22 06:40:05 UTC; 21ms ago  
Main PID: 65517 (prometheus)  
Tasks: 5 (limit: 4609)  
Memory: 2.8M (0)  
CGroup: /system.slice/prometheus.service  
└─65517 /usr/local/bin/prometheus --config.file=/etc/prometheus/prometheus.yml --storage.tsdb.path=/data --web.console.templates=/etc/promethe  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.057Z caller=head.go:681 level=info component=tsdb msg="On-disk memory mappable chunks repl  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.057Z caller=head.go:689 level=info component=tsdb msg="Replaying WAL, this may take a whil  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.063Z caller=head.go:760 level=info component=tsdb msg="WAL segment loaded" segment=0 maxSe  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.063Z caller=head.go:797 level=info component=tsdb msg="WAL replay completed" checkpoint_re  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.064Z caller=main.go:1045 level=info fs_type=EXT4_SUPER_MAGIC  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.064Z caller=main.go:1048 level=info msg="TSDB started"  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.065Z caller=main.go:1229 level=info msg="Loading configuration file" filename=/etc/prometh  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.065Z caller=main.go:1266 level=info msg="Completed loading of configuration file" filename  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.065Z caller=main.go:1009 level=info msg="Server is ready to receive web requests."  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.066Z caller=manager.go:1009 level=info component="rule manager" msg="Starting rule manage  
lines 1-19/19 (END)  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.057Z caller=head.go:681 level=info component=tsdb msg="On-disk memory mappable chunks repl  
ay completed" duration=11.565µs  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.057Z caller=head.go:689 level=info component=tsdb msg="Replaying WAL, this may take a whil  
e"  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.063Z caller=head.go:760 level=info component=tsdb msg="WAL segment loaded" segment=0 maxSe  
gment=0  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.063Z caller=head.go:797 level=info component=tsdb msg="WAL replay completed" checkpoint_re  
play_duration=13.029µs wal_replay_duration=6.533649ms wbl_replay_duration=271ns total_replay_duration=6.572988ms  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.064Z caller=main.go:1045 level=info fs_type=EXT4_SUPER_MAGIC  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.064Z caller=main.go:1048 level=info msg="TSDB started"  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.065Z caller=main.go:1229 level=info msg="Loading configuration file" filename=/etc/prometh  
eus/prometheus.yml  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.065Z caller=main.go:1266 level=info msg="Completed loading of configuration file" filename  
=/etc/prometheus/prometheus.yml totalDuration=949.557µs db_storage=3.29µs remote_storage=2.003µs web_handler=423ns query_engine=1.514µs scrape=326.609µs sc  
rape_sd=20.247µs notify=38.702µs notify_sd=6.018µs rules=47.20µs tracing=13.559µs  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.065Z caller=main.go:1009 level=info msg="Server is ready to receive web requests."  
Mar 22 06:40:05 Arunesh prometheus[65517]: ts=2025-03-22T06:40:05.066Z caller=manager.go:1009 level=info component="rule manager" msg="Starting rule manager  
..."  
^C  
arunesh@Arunesh:~$ sudo useradd \  
--system \  
--no-create-home \  
--shell /bin/false node_exporter
```

```
arunesh@Arunesh:~$ wget https://github.com/prometheus/node_exporter/releases/download/v1.6.1/node_exporter-1.6.1.linux-amd64.tar.gz
tar -xvf node_exporter-1.6.1.linux-amd64.tar.gz
--2025-03-22 06:42:18-- https://github.com/prometheus/node_exporter/releases/download/v1.6.1/node_exporter-1.6.1.linux-amd64.tar.gz
Resolving github.com (github.com)... 20.207.73.82
Connecting to github.com (github.com)[20.207.73.82]:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/5509b569-5c34-471e-8598-c05c0733bb7f?X-Amz-Algorithm=AWS4-HMA
C-SHA256&X-Amz-Credential=releasetestproduction%2F20250322%2Fus-east-1%2F%32Faws4_request&X-Amz-Date=20250322T064215Z&X-Amz-Expires=300&X-Amz-Signature=67
2794ec7dd9efbed2066f75ba9f49f7fbb401c51394a4b7386f94bc1c40525&X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename%3Dnode_exporte
r-1.6.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream [following]
--2025-03-22 06:42:15-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/9524057/5509b569-5c34-471e-8598-c05c0733bb7f?X-Amz-Alg
orithm=AWS4-HMAC-SHA256&X-Amz-Credential=releasetestproduction%2F20250322%2Fus-east-1%2F%32Faws4_request&X-Amz-Date=20250322T064215Z&X-Amz-Expires=300&X-A
mz-Signature=672794ec7dd9efbed2066f75ba9f49f7fbb401c51394a4b7386f94bc1c40525&X-Amz-SignedHeaders=host&response-content-disposition=attachment%3B%20filename
%3Dnode_exporter-1.6.1.linux-amd64.tar.gz&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.108.133, 185.199.109.133, 185.199.110.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)[185.199.108.133]:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 10368103 (9.9M) [application/octet-stream]
Saving to: 'node_exporter-1.6.1.linux-amd64.tar.gz'

node_exporter-1.6.1.linux-amd64.tar.gz 100%[=====] 9.89M 2.10MB/s in 5.4s

2025-03-22 06:42:22 (1.83 MB/s) - 'node_exporter-1.6.1.linux-amd64.tar.gz' saved [10368103/10368103]

node_exporter-1.6.1.linux-amd64/
node_exporter-1.6.1.linux-amd64/NOTICE
node_exporter-1.6.1.linux-amd64/node_exporter
node_exporter-1.6.1.linux-amd64/LICENSE
arunesh@Arunesh:~$ sudo mv \
node_exporter-1.6.1.linux-amd64/node_exporter \
/usr/local/bin/
arunesh@Arunesh:~$ $ rm -rf node_exporter*
arunesh@Arunesh:~$ node_exporter --version
node_exporter, version 1.6.1 (branch: HEAD, revision: 4a1b77600c1873a8233f3ff55afcedbb63b8d84)
 build user: root@8586879db11e5
 build date: 20230717-12:10:52
 go version: go1.20.6
 platform: linux/amd64
 tags: netgo osusergo static_build
arunesh@Arunesh:~$ sudo vim /etc/systemd/system/node_exporter.service
arunesh@Arunesh:~$ sudo systemctl enable node_exporter
```

```
node_exporter, version 1.6.1 (branch: HEAD, revision: 4a1b77600c1873a8233f3ff55afcedbb63b8d84)
 build user: root@8586879db11e5
 build date: 20230717-12:10:52
 go version: go1.20.6
 platform: linux/amd64
 tags: netgo osusergo static_build
arunesh@Arunesh:~$ sudo vim /etc/systemd/system/node_exporter.service
arunesh@Arunesh:~$ sudo systemctl enable node_exporter
sudo systemctl start node_exporter
sudo systemctl status node_exporter
journalctl -u node_exporter -f --no-pager
Created symlink /etc/systemd/system/multi-user.target.wants/node_exporter.service → /etc/systemd/system/node_exporter.service.
● node_exporter.service - Node Exporter
   Loaded: loaded (/etc/systemd/system/node_exporter.service; enabled; preset: enabled)
   Active: active (running) since Sat 2025-03-22 06:44:10 UTC; 15ms ago
   Main PID: 66496 (node_exporter)
     Tasks: 6 (limit: 4609)
    Memory: 3.6M (-)
   CGroup: /system.slice/node_exporter.service
           └─66496 /usr/local/bin/node_exporter --collector.logind

Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=netdev
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=netstat
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=nfs
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=nfsd
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=nmme
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=os
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=powersupplyclass
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=pressure
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=rapl
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=schedstat
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=thermal_zone
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=time
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=timex
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=udp_queues
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=uname
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=vmstat
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=xfs
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=node_exporter.go:117 level=info collector=zfs
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=tls_config.go:274 level=info msg="listening on" address=[::]:9100
Mar 22 06:44:10 Arunesh node_exporter[66496]: ts=2025-03-22T06:44:10.340Z caller=tls_config.go:277 level=info msg="TLS is disabled." http2=false address=[::
```

```
arunesh@Arunesh:~$ sudo vim /etc/prometheus/prometheus.yml
arunesh@Arunesh:~$ promtool check config /etc/prometheus/prometheus.yml
Checking /etc/prometheus/prometheus.yml
SUCCESS: /etc/prometheus/prometheus.yml is valid prometheus config file syntax

arunesh@Arunesh:~$ sudo apt-get install -y apt-transport-https software-properties-common
```

localhost:9090/graph?g0.expr=&g0.tab=1&g0.stacked=0&g0.show\_exemplars=0&g0.range\_input=1h

Prometheus Alerts Graph Status Help

☐ Use local time ☐ Enable query history ☒ Enable autocomplete ☒ Enable highlighting ☒ Enable linter

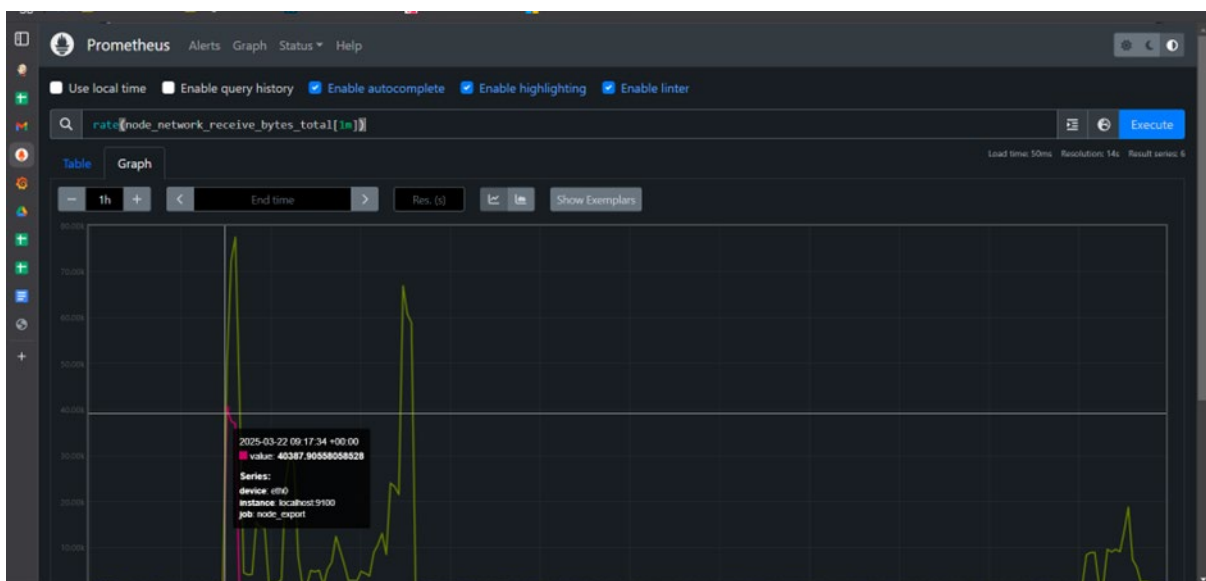
Expression (press Shift+Enter for newlines)

Table Graph

< Evaluation time >

No data queried yet

Add Panel





## GRAFANA

```
arunesh@Arunesh:~$ sudo vim /etc/prometheus/prometheus.yml
arunesh@Arunesh:~$ promtool check config /etc/prometheus/prometheus.yml
Checking /etc/prometheus/prometheus.yml
SUCCESS: /etc/prometheus/prometheus.yml is valid prometheus config file syntax

arunesh@Arunesh:~$ sudo apt-get install -y apt-transport-https software-properties-common
wget -q -O - https://packages.grafana.com/gpg.key | sudo apt-key add -
echo "deb https://packages.grafana.com/oss/deb stable main" | sudo tee -a /etc/apt/sources.list.d/grafana.list
sudo apt-get update
sudo apt-get -y install grafana
sudo systemctl enable grafana-server
sudo systemctl start grafana-server
sudo systemctl status grafana-server
[sudo] password for arunesh:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
software-properties-common is already the newest version (0.99.49.1).
The following NEW packages will be installed:
  apt-transport-https
0 upgraded, 1 newly installed, 0 to remove and 12 not upgraded.
Need to get 3974 B of archives.
After this operation, 35.8 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/universe amd64 apt-transport-https all 2.7.14build2 [3974 B]
Fetched 3974 B in 1s (3245 B/s)
Selecting previously unselected package apt-transport-https.
(Reading database ... 46821 files and directories currently installed.)
Preparing to unpack .../apt-transport-https_2.7.14build2_all.deb ...
Unpacking apt-transport-https (2.7.14build2) ...
Setting up apt-transport-https (2.7.14build2) ...
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
OK
deb https://packages.grafana.com/oss/deb stable main
Get:1 https://packages.grafana.com/oss/deb stable InRelease [7661 B]
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Ign:3 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:4 https://pkg.jenkins.io/debian-stable binary/ Release
Hit:5 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Get:7 https://packages.grafana.com/oss/deb stable/main amd64 Packages [369 kB]
Hit:8 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:9 http://security.ubuntu.com/ubuntu noble-security InRelease
```



